

IN THE CLAIMS

This listing of the claim will replace all prior versions and listings of claim in the present application.

Listing of Claims

1. (currently amended) A virtualization controller which is connected to one or a plurality of storages and one or a plurality of host computers, comprising:
 - a plurality of ports connected to one or both of said host computer and said storage_i and
 - one or a plurality of storage controllers, wherein:
 - each of said ports and said storage controllers comprises:
 - a virtualization processor which holds corresponding information between first identification information and second identification information, the first identification information being used for said host computer to access a storage area held by said storage, and said second identification information being used for said virtualization controller to identify said storage area, converts based on said corresponding information ~~the data~~ having the first identification information received from the host computer into ~~the data~~ having the second identification information, transfers the data thus converted to a storage having said storage area, converts ~~the data~~ having the second identification information received from said storage into ~~the data~~ having the first identification information, and transfers the data thus converted to said host computer,
 - wherein said virtualization processor ~~further including, comprises:~~
 - access path management information which registers a first port

controlled by said host computer, a second port connected to said storage, and said virtualization processor, as an access path for each storage area of said storage, and

wherein when a request for changing said access path is received, said access path management information is updated, and data send/receive control is carried out between the host computer and the storage area of the storage by use of a new access path, and

wherein said virtualization processor determines a type of access to a storage area being requested by an access request, manages information of the type of access being requested as access history management information and changes to said new access path based on said access history management information.

2. (currently amended) A virtualization controller, according to claim 1, further comprising:

a third port which is connected to a management server,

wherein, said access path management information is updated upon receipt of a change request as to the access path received from said management server via said third port, and the data send/receive control is carried out between said host computer and the storage area in said storage, by use of a new access path.

3. (currently amended) A virtualization controller, according to claim 1, further comprising:

a third port which is connected to a management server,

wherein,

schedule information is held as control information regarding an access path change received from said management server via said third port,

said access path management information is updated based on the schedule information, and

the data send/receive control between said host computer and the storage area of said storage is carried out by use of a new access path.

4. (currently amended) A virtualization controller, according to claim 1, further comprising, which is connected to one or a plurality of storages and one or a plurality of host computers, comprising:
a plurality of ports connected to one or both of said host computer and said storage; and
one or a plurality of storage controllers,
wherein each of said ports and said storage controllers comprises:
a virtualization processor which holds corresponding information between first identification information and second identification information, said first identification information being used for said host computer to access a storage area held by said storage, and said second identification information being used for said virtualization controller to identify said storage area, converts based on said corresponding information data having the first identification information received from the host computer into data having the second identification information, transfers the data thus converted to a storage having said storage area, converts data having the second

identification information received from said storage into data having the first identification information, and transfers the data thus converted to said host computer,

said virtualization processor comprises:

access path management information which registers a first port controlled by said host computer, a second port connected to said storage, and said virtualization processor, as an access path for each storage area of said storage, and

wherein when a request for changing said access path is received, said access path management information is updated, and data send/receive control is carried out between the host computer and the storage area of the storage by use of a new access path,

said virtualization controller further comprising:

a third port which is connected to a management server,

wherein:

management information by access type is held as control information regarding an access path change received from said management server via said third port,

a type of individual access request of a by-storage area of said storage is determined,

said type of access request is held and managed as access history management information by storage area,

said access path management information is updated based on said management information by said access type and said access history management information, and

the data send/receive control is carried out between said host computer and the storage area of said storage by use of a new access path.

5. (currently amended) A virtualization controller, according to claim 1, further comprising:

a third port which is connected to a management server,

wherein:

a threshold of usage rate of each module constituting said virtualization controller is held, which is control information regarding an access path change from said management server, received via said third port,

a usage status of each module constituting said virtualization controller is monitored,

said threshold is compared with said usage status, and at a timing when said usage status goes over said threshold, said access path management information is updated, and

the data send/receive control between said host computer and the storage area of said storage is carried out by use of a new access path.

6. (currently amended) A virtualization controller, according to claim 1, wherein:

information whether or not each of said storage area of said storage is subjected to a virtualization process is held as virtualization processing control information, and

a control is made to execute said virtualization process with respect to

each of said storage area included in said plurality of storages, based on said virtualization processing control information.

7. (currently amended) An access path control method which executes a change process of data identification information sent and received between a host computer and a storage, and further executes a conversion process of said identification information allocated to a storage area and carries out access path switching, comprising:

a step which detects a start-up timing of a switching process of the virtualization processor allocated with respect to each storage area held by said storage;₁

a step which monitors a processing status of an access request issued to said storage area which is a target for the switching process of said virtualization processor;₁

a step which temporarily queues said access request to the storage area which is a target for the switching process, newly received from said host computer, when incomplete access request exists, or which issues an instruction for changing the virtualization processor, to each of the modules which constitute the virtualization controller and relate to the switching process of said virtualization processor, when the incomplete access request does not exist;₁ and

a step which issues said access request thus queued to a new virtualization processor, at a timing when a completion report as to the instruction for changing said virtualization processor is received.

8. (currently amended) A computer system comprising: in which
one or a plurality of storages;
one or a plurality of host computers; and
a virtualization controller;
said one or a plurality of storages, said one or a plurality of host
computers, and said virtualization controller are connected to each other,
wherein;
said virtualization controller comprises;
a plurality of ports connected to one or both of said host computer and
said storage, and
one or a plurality of storage controllers,
wherein;
each of said ports and said storage controllers comprises;
a virtualization processor which holds corresponding information
between first identification information and second identification information,
said the first identification information being used for said host computer to
access a storage area held by said storage, and said second identification
information being used for said virtualization controller to identify said storage
area, converts based on said corresponding information the data having said
the first identification information received from the host computer into the
data having said the second identification information, transfers the data thus
converted to a storage having said storage area, converts the data having the
second identification information received from said storage into the data
having the first identification information, and transfers the data thus
converted to the host computer,

wherein said virtualization controller further including, comprises:

access path management information which registers a first port connected to said host computer, a second port connected to said storage, and said virtualization processor, as an access path for each storage area of said storage, and

wherein when a request for changing said access path is received, said access path management information is updated, and data send/receive control is carried out between the host computer and the storage area of the storage by use of a new access path, and

wherein said virtualization processor determines a type of access to a storage area being requested by an access request, manages information of the type of access being requested as access history management information and changes to said new access path based on said access history management information.

9. (new) A virtualization controller according to claim 1, wherein a process of changing the access path is carried out based on usage status of each resource to which access is controlled by said virtualization controller.

10. (new) A virtualization controller according to claim 1, wherein a process of changing the access path is carried out based on a policy set by a manager.

11. (new) A virtualization controller according to claim 4, wherein a process of changing the access path is carried out based on usage status of each resource to which access is controlled by said virtualization controller.

12. (new) A virtualization controller according to claim 4, wherein a process of changing the access path is carried out based on a policy set by a manager.

13. (new) An access path control method according to claim 7, wherein a process of switching the access path is carried out based on usage status of each resource to which access is controlled by said virtualization controller.

14. (new) An access path control method according to claim 7, wherein a process of switching the access path is carried out based on a policy set by a manager.

15. (new) A computer system according to claim 8, wherein a process of switching the access path is carried out based on usage status of each resource to which access is controlled by said virtualization controller.

16. (new) A computer system according to claim 8, wherein a process of switching the access path is carried out based on a policy set by a manager.